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SUBJECT INDEX

NTRODUCTION.

The entries in this index refer to the abstracts by their serial number, not by the page number. The entries are grouped under headings (underlined, e.g. "Abrasion") which represent, in the main, general categories or concepts rather than specific names. If a heading for a particular subject does not appear, a more general heading should be consulted; for example, "Zone plates" would be listed under "Diffraction"; "Barkhausen discontinuities" under "Magnetization process". There are numerous cross-references directing attention to related headings in other parts of the index.

Many of the headings are subdivided by the use of subheadings, which are indented (i.e. printed slightly to the right) and commence with a small letter (for example, see the subheadings under "Absorption").

ARRANGEMENT OF HEADINGS AND SUBHEADINGS.

The headings are arranged throughout the index in alphabetical order according to British Standard 1749:1951 (the "word by word" system, not "reading right through"). The subheadings, with a few exceptions, are themselves arranged in alphabetical order under their respective headings. The exceptions (for example, see the subheadings under "Spectra", "Crystal structure, atomic") are cases where a more logical order is preferable to a purely alphabetical one.

ARRANGEMENT OF ENTRIES JNDER HEADINGS.

Entries are arranged in three alphabetical groups as follows. First group: generalities; second group: named substances (in words); third group: named substances (chemical formulae). If a search is being made for a particular substance, both the second and third alphabetical groups should be inspected since, for example, alumina may also be listed as Al_2O_3.

COLLECTED LIST OF SUBJECT IEADINGS.

The alphabetical arrangement of the headings is the most convenient for locating a known heading quickly, but there may be other related headings elsewhere in the index of which the reader is unaware, and which he would only come across by accident. To assist the reader to discover all the headings appropriate to his subject, a collected list of the headings is given at the end of the index, which should be consulted as a matter of routine each time a search is made. In this list, the headings are not arranged in alphabetical order, but are grouped into sections by subject on the same basis as the arrangement of the abstracts in the monthly issues of Physics Abstracts. By using this list, the reader can quickly determine which are the headings appropriate to his subject, and they are then easily found in the main index in their alphabetical position.

IEADINGS WITH NO ENTRIES.

Because physics is a developing subject, it is not possible to maintain the list of headings unchanged from year to year; it is subject to a continuous process of revision, with the introduction of new headings and subheadings, and the alteration and elimination of old ones. This process is a gradual one, however, and the great majority of the headings are the same as those of the previous year. To assist in maintaining the continuity of the index, all the headings in current use are printed each year, even those for which there are no abstracts to be recorded in the present volume. The latter are followed by the announcement "No entries this year"; this supplies confirmation that these headings have not been dropped from the index, and entries may reappear under them next year.

ELEMENTS, COMPOUNDS AND OTHER SUBSTANCES.

The names of elements, their compounds, a few compounds of special interest (e.g. "Water") and a few common materials (e.g. "Wood", "Paper") are included as headings. Under these, as well as under the appropriate "subject" headings, are listed any abstracts which contain significant physical information about the element, compound or substance named; except, however, that abstracts listed under the following headings are not necessarily also listed under the substance name:

Atoms
Molecules
Crystal structure, atomic
Spectra
Luminescence spectra
Raman spectra
All headings referring to nuclear properties; including Radioactivity

(The entries under these headings are themselves arranged in alphabetical order of substance or nuclide names, so that a given substance can be readily located).

Inorganic compounds of the elements are listed under the first element in the chemical formula, and all the compounds of a given element are grouped under a single heading (e.g. "Sodium compounds"). All alloys are grouped under the single heading "Alloys" in alphabetical order of the first constituent. All organic compounds are grouped under the single heading "Organic compounds", except polymers which are grouped under "Polymers", and those under special substance headings such as "Paper"; all the latter are listed in the collected list of headings at the end of the index.

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Nightglow (See Airglow).

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- Scattering, particles
- Range of particles
- Velocity analysis, particles
- Particle tracks
- Particle track visualization
- Fundamental particles
- Parity
- Field theory, quantum
    - meson field
- Leptons
- Baryons

- Photons
- Bremsstrahlung
- Cherenkov radiation
- Compton effect
- Gamma-rays
    - absorption
    - angular distribution
    - detection, measurement
    - effects
    - internal conversion
    - scattering
- Gamma-ray spectra
- Gamma-ray spectrometers

- X-rays
    - effects
- X-ray measurement
- X-ray absorption
- X-ray diffraction
- X-ray reflection
- X-ray scattering

- Neutrinos and antineutrinos

- Electrons
    - absorption
    - ionization
    - radiation
    - scattering
- Electron theory
- Positrons
- Electron pairs
- Positronium
- Electron annihilation
- Beta-rays
    - absorption
    - angular distribution
    - detection, measurement
    - effects
    - scattering
- Beta-ray spectra
- Beta-ray spectrometers

- Nucleons and antinucleons
- Protons and antiprotons
    - absorption
    - angular distribution
    - detection, measurement
    - effects
    - interactions
    - magnetic moment
    - polarization
    - production
    - scattering
    - scattering, proton-deuteron
    - scattering, proton-proton
    - antiprotons

- Neutrons and antineutrons
    - absorption
    - angular distribution
    - detection, measurement
    - diffusion
    - effects
    - interactions
    - polarization
    - production
    - reflection
    - refraction
    - scattering
    - scattering, proton-neutron
- Neutron diffraction
- Neutron spectra
- Neutron spectrometers

- Mesons
    - absorption
    - capture
    - decay
    - decay observations
    - detection, measurement
    - effects
    - interactions
    - magnetic moment
    - [redacted]
    - production
    - scattering
    - spin and parity
- Atoms, mesic

- Hyperons
    - absorption
    - capture
    - decay
    - decay observations
    - detection, measurement
    - effects
    - interactions
    - magnetic moment
    - [redacted]
    - production
    - scattering
    - spin and parity
- Hyperfragments
- Strange particles

- Deuterons
    - scattering
    - effects

- Tritons

- Alpha-particles
- Alpha-rays
    - absorption
    - angular distribution
    - detection, measurement
    - effects
    - scattering
- Alpha-ray spectra
- Alpha-ray spectrometers

COSMIC RAYS

- Cosmic rays
  - absorption
  - apparatus
  - composition
  - alpha-particles
  - deuterons
  - electrons
  - mesons
- Cosmic rays
  - neutrons
  - photons
  - protons
  - effects and interactions
  - origin
  - showers and bursts
  - variations

NUCLEUS

- Nuclear physics
- Nucleus
  - electric moment
  - energy levels
  - magnetic moment
  - spin
  - theory
- Hyperfragments
- Nuclear excitation
- Nuclear decay theory
- Beta decay theory
- Nuclear magnetic resonance and [relaxation
- Gyromagnetic ratio
- Nuclear forces
- Nuclear isomerism

- Nucleus
  - energy levels
- Nuclear excitation
- Gamma-ray spectra

RADIOACTIVITY . NUCLEAR DECAY

- Radioactivity
  - artificial production
  - decay periods
  - decay schemes
  - electron capture
- Nuclear decay theory
- Beta decay theory
- Radioactivity measurement
  - apparatus
- Radioactive dating
- Radioactive tracers
- Radiation protection
- Radiation monitoring
- Biological effects of radiations
- Dosimetry
- Chemical effects of radiations
  - ionizing radiations
- Radiochemistry
- Physical effects of radiations

- Atmosphere
  - radioactivity
- Fallout
- Alpha-rays
  - absorption
  - angular distribution
  - detection, measurement
  - effects
  - scattering
- Alpha-ray spectra
- Alpha-ray spectrometers
- Alpha-ray particles

- Beta-rays
  - absorption
  - angular distribution
  - detection, measurement
  - effects
  - scattering
- Beta-ray spectra
- Beta-ray spectrometers

- Gamma-rays
  - absorption
  - angular distribution
  - detection, measurement
  - effects
  - internal conversion
  - scattering
- Gamma-ray spectra
- Gamma-ray spectrometers
- Compton effect

NUCLEAR REACTIONS

- Nuclear excitation
- Nuclear forces
- Collision processes -
- Nuclear reactions
  - chemical effects
- Nuclear reactions due to
  - alpha-rays
  - cosmic rays
  - deuterons
  - electrons
  - helium - 3
  - mesons
  - neutrons
  - nuclei of $Z > 2$
  - photons
  - protons
  - tritons
- Thermonuclear reactions
- Nuclear fission
  - products
- Nuclear fusion
- Nuclear spallations

- Physical effects of radiations
- Chemical effects of radiations
  - ionizing radiations
- Biological effects of radiations
- Radiation monitoring
- Radiation protection

NUCLEAR POWER STUDIES

- Nuclear reactors
  - fission
  - fusion

- Thermonuclear reactions
- Nuclear fission
  - products
- Nuclear fusion
- Nuclear spallation
- Physical effects of radiations
- Chemical effects of radiations
  - ionizing radiations

- Biological effects of radiations
- Radiation monitoring
- Radiation protection

- Dosimetry
- Radiochemistry

ATOMS

- Atoms
  - excitation
  - magnetic moment
  - structure
- Atoms, mesic
- Constants
  - fundamental
- Gyromagnetic ratio
- Ionization potential
- Atomic mass
- Atomic weight
- Atomic beams
- Periodic system
- Elements
  - origin
  - relative abundances
- Isotopes
- Mass spectrometers
  - accessories
  - applications
- Tracers
- Optical pumping
- Spectra
  - atoms
- Isotopes
  - detection
  - relative abundances
- Mass spectra
- Isotope exchanges
- Isotope separation
- Mass spectrometers
  - accessories
  - applications
- Atoms, mesic

MOLECULES

- Molecules
  - configuration and dimensions
    - inorganic
    - organic
    - macromolecules
  - dissociation
  - dissociation energies
  - excitation
  - intermolecular mechanics
  - internal mechanics
    - electronic structure
    - nuclear coupling
    - vibration and rotation
- Molecules
  - moments
  - relaxation
- Bonds
- Valency
- Chemical structure
- Spectra
- Molecular beams
- Molecular weight
- Avogadro' s number
- Polymers
- Isomerism

- Spectra
  - inorganic molecules
    - diatomic
    - diatomic, radiofrequency
    - polyatomic
    - polyatomic, radiofrequency
  - organic molecules and substances
    - infrared
    - radiofrequency

SOLID-STATE PHYSICS

Solids
    structure
    theory
Electron gas
Cyclotron resonance
Metals
    theory

Equations of state
    solid
Crystals
Crystal properties
Colour centres
Crystal structure
Crystal structure, atomic
Physical effects of radiations

Lattice Dynamics

Crystals
    lattice mechanics

Acoustic wave propagation
    ultrasonic
Scattering
    acoustic waves
Diffraction
    acoustic waves
Absorption
    acoustic waves
Transmission
    acoustic waves

Specific heat
Heat capacity
Thermal expansion
Thermal transformations
Melting
Melting point

Conductivity, thermal
    solids
Equations of state
    solid

Crystals
    electron states
Crystal structure
Crystal properties
Electron gas
Cyclotron resonance
Electron beams
    effects

Electrons
    scattering
    absorption
    radiation

Defect Properties

Crystal structure
Crystals
    imperfections
    etching
    twinning
Slip
Cold working
Heat treatment
Elastic deformation
Plastic deformation
Diffusion, solids
Colour centres
Absorption
    light
X-rays
    effects

Physical effects of radiations
Electron beams
    effects

Ion beams
X-rays
    effects
Protons
    effects
Neutrons
    effects
Mesons
    effects
Gamma-rays
    effects

ELECTRICAL PROPERTIES OF SOLIDS

Electricity
Electrical measurement
Conduction, electrical
Electron gas
Conductivity, electrical
    electrolytic
Resistance, electrical
Contact resistance
Contact potential
Current, electrical
Fluctuations
    electrical

Skin effect
Eddy currents
Magnetoelectric effects
Hall effect
Magnetoresistance

Electro-optical effects
Acoustoelectric effects
Superconductivity
Electrokinetic effects

Semiconductors

Semiconductors
Semiconducting materials
    germanium
    indium antimonide
    silicon
Semiconducting devices
    diodes and junctions
    transistors

Rectifiers

Magnetoelectric effects
Hall effect
Magnetoresistance

Photoconductivity

Photoelectricity
Photoconductivity
Photovoltaic effects

Thermoelectric Properties

Thermoelectricity
Thermocouples
Pyroelectricity

Dielectric Properties

Electric fields
Electric charge
Space charge
Contact potential

Breakdown, electric
    solids
Hysteresis
Relaxation
Electric strength
Electrets
Rochelle salt

Dielectric phenomena
Dielectric measurement
Dielectric properties of substances
    solids
Ferroelectric materials
Ferroelectric phenomena

Piezoelectricity
Piezoelectric oscillations
Electrostriction
Electroluminescence
Pyroelectricity

OPTICAL PROPERTIES OF SOLIDS

- Optics
- Velocity
  - light
- Refraction
  - light
- Refractive index
  - light
- Dispersion, optical
- Optical constants
- Optical materials
- Optical films
- Absorption
  - light
- Transmission
  - light
- Transparency
- Pleochroism
- Filters, optical
- Reflection
  - light
- Reflectivity
- Optical constants

- Interference
  - light
- Interferometry
  - light
- Interferometers
  - light
- Diffraction
  - light
- Diffraction gratings
- Scattering
  - light
- Diffusion, light
- Polarized light
- Double refraction
  - flow
  - mechanical

- Optical rotation
- Magneto-optical effects
- Electro-optical effects
- Photoelasticity

- Spectra
  - continuous
  - flames
  - resonance
  - atoms
  - inorganic molecules
    - diatomic
    - diatomic, radiofrequency
    - polyatomic
    - polyatomic, radiofrequency
  - inorganic solids
    - radiofrequency
  - organic molecules and substances
    - infrared
    - radiofrequency
- Raman spectra
  - inorganic
  - organic
- Stark effect
- Zeeman effect
- Spectral line breadth
- Electro-optical effects

- X-ray spectra
  - absorption
  - emission
- Optical pumping

- Luminescence
  - inorganic
  - organic
- Electroluminescence
- Luminescent devices
- Colour centres

MAGNETIC PROPERTIES OF SOLIDS

- Magnetism
- Magnetic fields
  - effects
- Ferromagnetism
- Magnetization state
- Magnetization process
- Ferromagnetic relaxation
- Antiferromagnetism
- Ferrimagnetism
- Antiferrimagnetism
- Paramagnetism
- Diamagnetism
- Gyromagnetic ratio
- Ferrites

- Magnetic properties of substances
  - ferromagnetic
  - antiferromagnetic
  - paramagnetic
  - diamagnetic
- Magnetoelectric effects
- Magnetoresistance
- Hall effect
- Magnetomechanical effects
- Gyromagnetic effect
- Magnetostriction
- Magneto-optical effects
- Magnetothermal effects
- Magnetoacoustic effects
- Zeeman effect

Magnetic Resonances

- Ferromagnetic resonance
- Ferromagnetic relaxation
- Antiferromagnetic resonance
- Ferrimagnetic resonance
- Antiferrimagnetic resonance
- Cyclotron resonance

- Paramagnetic resonance and relaxation
- Nuclear magnetic resonance and relaxation
- Masers
- Optical pumping

MECHANICAL PROPERTIES OF SOLIDS

- Elasticity
- Elastic constants
- Stress analysis
- Photoelasticity
- Stress/strain relations
- Stresses, internal
- Strain gauges
- Elastic limit
- Internal friction
- Elastic deformation
- Bending
- Torsion

- Plasticity
- Plastic deformation
- Plastic flow
- Slip
- Viscoelasticity
- Compressibility
- Elastic fatigue
- Elastic relaxation
- Hysteresis

- Creep
- Mechanical strength
- Breaking strength
- Impact
- Fracture
- Brittleness

- Adhesion
- Abrasion
- Hardness
- Work hardening
- Heat treatment
- Cold working
- Stresses, internal

- Rheology
- Thixotropy
- High-pressure phenomena and effects
- Friction
- Lubrication

CRYSTALLOGRAPHY
CRYSTAL STRUCTURES

- Phase transformations
- Crystal structure
- Metals
  - theory
- Density
  - solids
- Solids
  - structure
  - theory
- Crystal properties
- Crystals
- Crystallography
  - mathematical
- Crystals
  - electron states
  - etching
  - faces
  - growth
  - imperfections
  - lattice mechanics
  - orientation
  - twinning
- Crystal chemistry
- Crystallization
- Heat of crystallization
- Polymorphism

- Crystal properties
- Colour centres
- Counters
  - crystal
- Crystal structure

- Mineralogy
- Crystal structure, atomic
  - elements
  - inorganic compounds
  - organic compounds
- X-ray crystallography
  - apparatus
  - calculation apparatus
  - calculation methods
  - technique
- X-ray examination of materials
  - microstructure
  - molecular structure
- Electron diffraction crystallography
- Electron diffraction examination
- Electron microscope examination
- Neutron diffraction crystallography
- Neutron diffraction examination

VARIOUS SOLID STRUCTURES

- Alloys
- Metallurgy
- Solid solutions
- Solubility
- Precipitation
- Steel
- Zone refining
- Sputtering
- Sintering
- Crystal structure, atomic
  - alloys
- Phase transformations
- Heat treatment
- Cold working

- Amorphous state
- Vitreous state
- Glass
- Plastics
- Polymers
- Granular structure

- Powders
- Fibres
- Membranes
- Waxes
- Brittleness
- Particle size
- Sintering
- Porosity
- Permeability, mechanical
- Surface phenomena
- Surface texture
- Surface energy
- Surface measurement

- Films
  - solid
- Membranes
- Filters

- Permeability, mechanical
- Diffusion, solids

X-ray and Electron Microscope Examination

- X-ray examination of materials
  - microstructure
  - molecular structure
- Radiography

- Electron diffraction examination
- Electron microscope examination
- Electron microscopes
- Electron microscopy
- Ion microscopes
- Microscopy
- Neutron diffraction examination

- Granular structure
- Particle size
- Surface texture

PHYSICAL CHEMISTRY

- Atomic weight
- Molecular weight
- Molecular weight determination
- Avogadro' s number
- Periodic system
- Elements
  - origin
  - relative abundances
- Bonds
- Valency
- Chemical structure

- Polymers
- Polymerization
- Isomerism

- Laboratory apparatus
- Balances
- Pumps
- Centrifuges
- Distillation
- Filters
- Chemical technology
- Precipitation

THERMOCHEMISTRY . REACTIONS

- Phase equilibrium
- Crystal chemistry
- Reaction kinetics
- Chemical reactions
- Dissociation
- Oxidation
- Exchanges, chemical
- Isotope exchanges

- Heat of adsorption
- Heat of reaction
- Heat of formation
- Heat of dissociation
- Explosions
- Combustion
- Heat of combustion
- Catalysis

ELECTROCHEMISTRY

- Electrochemistry
  - electrodes
- Electrolysis
- Conductivity, electrical
  - electrolytic
- Ions, electrolytic

- Ion velocity
  - electrolytic
- Electrophoresis
- Zeta-potential
- Electrolytic deposition
- Dissociation
  - electrolytic

PHOTOCHEMISTRY
RADIATION CHEMISTRY

- Chemical effects of radiations
  - acoustic waves
  - ionizing radiations

- Nuclear reactions
  - chemical effects
- Photochemistry
- Photophoresis

DISPERSIONS . COLLOIDS ADSORPTION

- Colloids
- Thixotropy
- Solutions
- Solubility
- Heat of solution
- Osmosis
- Membranes
- Sols
- Gels
- Emulsions
- Suspensions
- Precipitation

- Aerosols
- Foams
- Particle size
- Centrifuges
- Sedimentation
- Filters
- Surface phenomena
- Chromatography
- Phase transformations
- Adsorption
- Adsorbed layers
- Heat of adsorption
- Sorption

PHYSICAL METHODS OF CHEMICAL ANALYSIS

- Chemical analysis
    - adsorption
    - electrochemical
    - by mass spectrometry
    - by nuclear reactions
    - radioactive
    - X-ray

- Spectrochemical analysis
- Tracers
- Radioactive tracers
- Radiochemistry

GEOPHYSICS

- Geophysics
- Gravity
- Seismology
- Seismic waves
- Seismographs
- Terrestrial electricity

- Magnetism
- Magnetic storms
- Compasses
- Terrestrial magnetism
    - variations

- Earth
    - age
    - composition
    - heat
    - rotation
- Radioactive dating
- Minerals
- Mineralogy
- Geophysical prospecting
- Oceanography
- Tides
- Seawater
- Glaciers

ATMOSPHERE . IONOSPHERE

- Meteorology
- Meteorological instruments
- Weather
- Satellites, artificial

- Hygrometers
- Anemometers
- Atmospheric pressure
- Humidity

- Atmosphere
    - composition
    - humidity
    - movements
    - radioactivity
    - radiation belts
    - structure
    - temperature
    - thermodynamics
- Fallout

- Atmospheric disturbances
- Thunderstorms
- Sunlight
- Sky brightness
- Wind
- Clouds
- Snow
- Ice
- Rain
- Fog
- Condensation
- Evaporation
- Climatology

- Atmospheric optics
- Atmospheric spectra
- Visibility
- Atmospheric electricity
- Atmospherics
- Lightning
- Atmospheric acoustics

- Ionosphere
- Ionosphere measuring apparatus
- Ionization, atmosphere
- Airglow
- Twilight
- Zodiacal light
- Aurora

BIOPHYSICS · PHYSIOLOGICAL PHYSICS

- Biology
- Biophysics
- Biological techniques and instruments
- Physiology

- Zoology
- Medical science
- Proteins
- Blood

- Bone
- Biological effects of radiations
    - acoustic waves
    - ionizing radiations
- Radiography
- Hygiene
- Radiation protection
- Dosimetry

Hearing . Speech

- Ear
- Speech
- Hearing
- Hearing aids
- Noise

Vision

- Vision
- Colour vision
- Eye
- Stereoscopy

TECHNIQUE . MATERIALS

Laboratory apparatus and technique
Low-temperature technique
Vacuum technique
Leak detection

Biological technique and instruments
Chemical technology
Metallurgy
Zone melting and refining

MATERIALS

The chemical elements are listed by names, followed by their compounds. Organic compounds are grouped under the heading "Organic compounds". In addition, there are also the following special substance headings:

Alkali metals
Alkali metal compounds
Alkaline earth metals
Alkaline earth compounds

Alloys
Inert gases
Rare earth metals
Rare earth compounds

Deuterium
Tritium
Air
Ozone
Liquid helium
Ice
Steam
Water
Seawater

Alloys
Metals
Semiconductors
Semiconducting materials

Steel
Fibres
Paper
Wood
Minerals
Diamonds
Graphite
Ferrites

Glass
Glass-metal seals
Mica
Optical materials
Quartz
Rochelle salt

Bitumen
Ceramics
Coal
Concrete
Clay
Sand
Soil

Bone
Blood
Gelatin
Leather
Proteins
Rubber
Waxes
Plastics
Polymers

UNWIN BROTHERS LIMITED, WOKING AND LONDON

REFERENCE
FOR READING ROOM
USE ONL